Alaska Department of Fish and Game
Division of Wildlife Conservation
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Assessing Wildland Fire Impacts on the Winter Habitat Use and Distribution of Caribou Within Alaska's Boreal Forest Ecosystem

Bruce W. Dale

Research Performance Report
1 July 2002–30 June 2003
Federal Aid in Wildlife Restoration
Grant W-33-1, Project 3.44

This is a progress report on continuing research. Information may be refined at a later date.

FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
Juneau, AK 99802-5526

PROJECT TITLE: Assessing wildland fire impacts on the nutritional performance and distribution of caribou within Alaska's boreal forest ecosystem

PRINCIPAL INVESTIGATOR: Bruce W. Dale

COOPERATORS: W. Collins (ADF&G), K. Joly and L. Adams (USGS)

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NR.: W-33-1

PROJECT NR.: 3.44

WORK LOCATION: GMU 11, 12, 13 and 20E: The Nelchina, Copper and Upper Tanana River Drainages

STATE: Alaska

PERIOD: 1 July 2002–30 June 2003

I. PROGRESS ON PROJECT OBJECTIVES

The project statement was amended during the previous segment period. Changes included a change in title and several objectives to reflect the ongoing collaboration between USGS and ADF&G in studying the influence of wildland fire on caribou.

Objective 1: Determine the nutritional status of 4 cohorts of female caribou prior to their first winter.

During this segment period, we evaluated the nutritional status of the fourth (2002) cohort of female caribou prior to their first winter. Calves of the 2002 cohort were smaller and lighter than the previous 3 cohorts.

Objective 2: Determine distribution and habitat use (relative to fire history and lichen abundance) of female caribou during their first winter.

By the end of this segment period, we have evaluated the monthly distribution and habitat use of approximately 100 caribou for each of the last 4 years. Caribou avoided recent fires and most caribou apparently selected habitats with abundant fruticose lichens in winter.

Objective 3: Determine seasonal changes in body mass of young female caribou to evaluate the influence of fire history and lichen abundance on nutritional performance.

We conducted the first half of our fourth year of repeated measures of seasonal changes in body mass. The final data will be collected in October 2003. Summer weight change had a much greater influence on weight at 11 and 16 months compared to winter weight change.

Objective 4: Evaluate influences of density, distribution, and habitat indices on changes in body mass.

We began developing indices and summarized body mass data. Winter and summer distributions varied during the third year from the patterns seen during the first 2 years. The fourth year winter distribution was similar to the first 2 winters. Fewer caribou wintered on the current winter range and caribou were more disbursed during summer during the third year. Summer body weights, which were higher in the third year, returned to values similar to previous years.

Objective 5: Evaluate relationships between distribution and survival.

We continued development of distribution indices and summarized annual survival data. Survival rates were similar to the first 3 years.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

Objective 1:

Job/Activity a. Capture and weigh at least 30 female caribou calves during the peak of calving

We captured and weighed approximately 30 female neonate calves using standard techniques from a chartered helicopter on June 25, 2003.

Job/Activity b. Capture, weigh, measure body parameters, radiocollar and collect blood samples from 40 five-month-old female caribou.

We captured, weighed and measured body parameters of 40 five-month-old female caribou from the 2002 cohort using standard capture techniques from chartered helicopters during the first week of October, 2002.

Objective 2:

Job/Activity a. Conduct periodic aerial radiotelemetry flights.

We chartered fixed wing aircraft and located all radiocollared caribou once each month during the segment period. Approximately three days of flying were required to locate all animals each month.

Objective 3:

Job/Activity a. Recapture individual female caribou calves in April after their first winter and in October after their second summer.

We recaptured and evaluated overwinter nutritional performance of the 24 surviving female calves from the 2002 cohort (Objective 1, Job B) starting the week of April 22, 2003.

Job/Activity b. Capture additional caribou, evaluate their nutritional status and fit with radio transmitters as necessary to maintain sample sizes within each cohort.

We collared an additional 6 animals as necessary to maintain a sample of 30 calves from the 2002 Cohort and at least 100 total caribou.

Job/Activity c. Evaluate nutritional status and remove transmitters from caribou at 16 months of age.

We recaptured and measured oversummer nutritional performance of 24 surviving 16-month-old females from the 2001 cohort during the first week of October, 2002. Radio transmitters were removed or replaced with adult collars at that time.

Objective 4:

Job/Activity a. Calculate distribution indices and compare to nutritional performance measures via appropriate regression techniques.

We continued developing indices during this segment period. Final analyses will be conducted following the October 2003 data collection effort.

Objective 5:

Job/Activity a. Calculate Kaplan-Meier survival estimates to describe basic survival functions of each cohort. Use logistic regression to evaluate the relationship between the density and distribution indices and probability of survival.

We summarized seasonal survival estimates for the year. April 2002 through September 2002 survival of adults and yearlings was 95.7% and 82.4%, respectively. October 2002 through March 2003 survival of adults, yearlings and calves was 90.0%, 86.7%, and 80% respectively. In addition, we conducted some preliminary analyses of spatial patterns of mortality relative to caribou distributions. These analyses were conducted largely to explore the functionality of various statistical and analytical methods relative to our datasets.

III. ADDITIONAL FEDERAL AID FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

No additional federal aid funded work was accomplished on this project during this segment period.

IV. PUBLICATIONS

A manuscript describing caribou movements relative to fire history was completed and has been accepted by the Canadian Journal of Zoology. Two additional manuscripts are in prep.

V. RECOMMENDATIONS FOR THIS PROJECT: The project statement was amended during the last segment period. There are no new recommendations for this project.

VI. APPENDIX

Capture mortalities.

We had 3 capture mortalities out of a total of 104 captures during this reporting period. Dart wounds caused two of the capture mortalities. One dart punctured a lung on an emaciated animal. The other penetrated the peritoneum of an animal in poor condition. The cause of the third mortality is unknown. It responded appropriately to the antagonists, but was found dead near the capture site on the following day. It appeared to be a healthy animal and no pathologies were observed during field necropsy.

VII. PUBLICATIONS

Kyle Joly, Bruce W. Dale, William B. Collins, and Layne G. Adams. 2003. Winter habitat use by female caribou in relation to wildland fires in interior Alaska. Can. J. Zoo. 81(7). 1192-1201.

Abstract: The role of wildland fire to the winter ecology of caribou (*Rangifer tarandus*) has long been debated. Initially, it was theorized that fires were detrimental to caribou populations because they destroyed the slow-recovering climax forage lichens that caribou utilize in winter. Avoidance of recent fires has been documented for caribou in Canada. Other researchers argued that caribou were not reliant on lichens and that fire may be beneficial, even in the short term. We evaluated the distribution of caribou relative to recent fires (<50 years old) within the current winter range of the Nelchina Caribou Herd. To address issues concerning independence and spatial and temporal scales, we used a combination of very high frequency (VHF) and Global Positioning System (GPS)-based telemetry to estimate caribou use relative to recent, known-aged burns within the current winter range of the Nelchina Caribou Herd. In addition, we employed 2

different methods to determine availability of burned and unburned habitats and edges of burns. Caribou were relocated in recently burned areas much less than expected based on availability. Moreover, by parsing out burn edges, selection for areas not having been burned within the last 50 years was more clearly revealed. Relocations within burned areas showed a strong tendency to be located near the perimeter of the burn rather than the core. The core of burned areas exhibited the least amount of use of any habitat type. Burns between 21 and 50 years old showed the least amount of use in proportion to availability. Methods for determining use and availability did not have large influences on trends in selectivity.

VII. PROJECT COSTS FOR THIS SEGMENT PERIOD

FEDERAL AID SHARE $ 33,750 + STATE SHARE $ 11,250 = TOTAL $45,000

VIII. PREPARED BY:

Bruce W. Dale
Wildlife Biologist III

SUBMITTED BY:

Earl F. Becker
Acting Research Coordinator

APPROVED BY:

_____
Thomas W. Paul
Federal Aid Coordinator
Division of Wildlife Conservation

_____
Matthew H. Robus, Director
Division of Wildlife Conservation

APPROVAL DATE: _____